

# Water Quality in Harkin Slough, West Struve Slough and Struve Slough

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## Introduction

Our group project for the 2008-2009 WATCH program is to see how agricultural and urban runoff affects the health of three different sloughs in Watsonville Ca: Harkin Slough, West Struve Slough and Struve Slough. The wetlands are an important part of coastal ecosystems and the surrounding communities. Wetlands serve as a carbon sink, natural filter and habitat for migrating birds and endangered species. The tests were used to determine how healthy the ecosystem is. We tested for phosphates, nitrates, dissolved oxygen, pH, turbidity, conductivity and temperature with chemical test kits and probes. Some samples were tested at MBARI for nitrates, ammonium and phosphate. Ecotoxicology tests were conducted at Granite Canyon Lab.

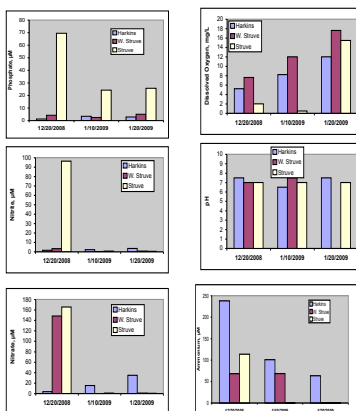
As more homes have been built around the sloughs and it is important to us that we educate homeowners in the neighborhoods around the sloughs how to avoid actions that will affect the slough. Our goal is to change how people think of the sloughs in order to change the activities that they do that impact the sloughs.

## Materials and Methods

Our group measured the water quality of three sloughs which ultimately drain into the Pajaro River: Struve Slough, West Struve Slough, and Harkins Slough. We sampled water three times over the course of a month on December 20, 2008, January 10, 2009 and January 20, 2009. Dissolved oxygen, phosphate, nitrate, pH, temperature, conductivity and turbidity were measured in the field using La Motte and CHEMetrics test kits and at times with a YSI 6600 V2 multi-parameter water quality sonde provided by the Monterey Bay Aquarium Research Institute (MBARI). All test kits meet the protocols of the Coastal Watershed Council's Citizen Monitoring Programs. GF/F filtered water was also collected, stored on ice, and then frozen at MBARI. These samples were later analyzed for ammonium, nitrate, nitrite and phosphate at MBARI to confirm the data from the test kits. We had amazing help by our mentor Josh Plant that works at MBARI. Our group had the honor of going to Granite Canyon to do ecotoxicology test with our mentor Josh Plant and Katie Seigler, a researcher at Granite Canyon Marine Labs. The purpose of the ecotoxicology test was to see if the water quality in the three sloughs were safe enough for living organisms. Amphipods were placed in three samples from each slough and a control. After, we left the amphipods in a controlled temperature room for three days.



## Results



## Discussion

Many people today do not know just how important the wetlands are to Watsonville. The wetlands purify water, plants trap sediments and toxins and during high river flow they store water, reducing downstream flooding. Forty five percent of the endangered animals and twenty six percent of the endangered plants live in the wetlands or depend on them. They are a natural sponge for water and provide a buffer for inland areas from storms and high waves.

The results that we were concerned about were some high levels of nutrients. The phosphates at Struve slough on 12/20/08 were above normal with it being above 2.0 ppm. The levels should not exceed 0.12 ppm. It may have been attributed by the runoff from the significant rainfall several days before causing the phosphates to rise even higher. Additional alarming results were the nitrates in West Struve and Struve slough on the same date. They were above 2.0 ppm, 0.08 ppm being normal range.

Dissolved oxygen was also measured and three out of nine of our tests were below and two were above the water quality objectives. The tests that were below normal oxygen levels were detected in the morning, the time when the sun is not giving as much sunlight to the plants. Bacteria and other creatures break down organic material during the day and night, taking up oxygen. During the day photosynthesis occurs producing more oxygen than being taken up. The tests being above normal were done in the afternoon the time when the sun is higher in the sky and having higher rates of photosynthesis in the water.

These high levels of nutrients on 12/20/08 can probably be explained by fertilizer runoff from homeowners in surrounding neighborhoods and/or agricultural fields. The highest levels of nitrate, nitrite and phosphates came after a significant rainfall event. The high levels of nutrients could trigger high algal bloom causing the beginning eutrophic conditions where oxygen levels drop dangerously low.

## Conclusion

The water quality of Harkins slough, West Struve Slough and Struve Slough was of high concern because the levels were not too high or too low in West Struve Slough and Harkins Slough. In Struve Slough the levels of; nitrates, phosphates and ammonium were high. One hypothesis is that recent construction of homes would increase the runoff from the impermeable streets and sidewalks. Homeowners often use fertilizers for their yards, which contain phosphates and nitrates. While there are still some agricultural runoff into Struve Slough, runoff from neighborhoods may also be a possible source of nutrient pollution. Further study could test storm drains during a runoff to test our hypothesis.

Our results suggest that homeowner use of fertilizer may have contributed to the high levels of nutrients in Struve Slough after the runoff event. We plan to inform the homeowners about the relationship of fertilizer use in their yards and the aquatic health of the wetland's ecosystem. We are going to attempt to educate homeowners through a brochure explaining our results and what they can do to help the slough. Homeowners can change the products they use that may affect the sloughs. The less impact the products they use, the less harmful the runoff will be.

## Literature Cited

If you would like to know more about our project you are more than welcome to visit the following websites or contact:

Gary Martindale: [gary\\_martindale@pvusd.net](mailto:gary_martindale@pvusd.net)

Josh Plant: [jplant@mbari.org](mailto:jplant@mbari.org)

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